
Book Reviews

The Playful Brain: Venturing to the Limits of Neuroscience

Sergio Pellis and Vivien Pellis

Oxford, U.K.: Oneworld Publications, 2009. Illustrations, endnotes, bibliography, index. xxx, 257 pp. \$29.95 cloth. ISBN: 9781851686322

While I was writing the review of this book, four fully grown European magpies that had hatched in a tall ash tree earlier in the summer were chasing each other round a deck chair outside my window. Then one of them flew up onto the top of the deck chair and slid down the sloping surface. Why were they doing this? The same question arises every year when my wife and I mate one of our pedigree cats and, after she has given birth, watch her kittens as they develop. Around three weeks of age, the kittens suddenly become active and start to pat and mouth each other. Wrestling, arching, and pouncing follows. At seven weeks, the kittens start to pat inanimate objects. If the object is furry, they will pounce on it and, having grabbed it, rake the object with their back legs. They spend about a tenth of each day engaged in these seemingly pointless activities.

If I call what they do, say, *xinging*, I can readily point to the behavior and get students to agree when they see more exam-

ples of *xinging*. It might seem pedantic not to call the activities of the young animals play without further ado, but the neutral label does draw attention to how readily we project into other animals the experiences we have of ourselves and our fellow human beings. Also if we avoid such projections, we are less likely to confuse patting social companions with patting objects, which, for the cat at least, have very different developmental trajectories. To my mind, evidence strongly suggests that play is a portmanteau term, and the activities included in it are heterogeneous. After all, it is not difficult to observe that human play comes in many different forms: solitary, imaginary, symbolic, verbal, social, constructional, rough-and-tumble, manipulative, and so forth. The play of a four-year-old boy wrestling with another four-year-old is descriptively quite different from that of, say, a solitary ten-year-old staring into space while indulging in some private fantasy about being a rock star or a doctor.

All that said, I was immediately well disposed towards this book because the cover has a picture of what I take to be a spotted silver Egyptian Mau, the very breed of cat that we have. The husband and wife author write attractively about their chosen subject, and they do not hesi-

tate to call what the magpies and kittens do play. No pedantry here, but the title of the book implies somewhat oddly that the brain plays. Without a doubt, play requires neural activity in the brain, but surely it is the animal that plays, not its brain. The authors are interested in “the last great challenge to the neural sciences,” but the confusion of levels leads to a softness of focus that detracts somewhat from the book.

The problems of relating brain states to behavior are not trivial. How do we distinguish between different explanations? Even the fashionable use of scanning methods to determine which parts of the brain light up when an individual behaves a certain way are fraught with difficulties. The part that lights up may be upstream or downstream from the part of the brain that actually controls the behavior. It may also be a side effect. Techniques have been developed to sort out these difficulties, using different approaches to eliminate a different subset of possible explanations. It is equivalent to triangulation when a surveyor seeks to determine the exact position of a given landmark. I was disappointed that the Pellises did not discuss these issues, which are so central to their overall aim to bring together behavior and the neurosciences.

The strength of their book, however, is their acute observations of rat play fighting and the comparison with mice that seem to do very little of it. The comparison serves to make a point that they stress repeatedly: data from one species or even one breed cannot necessarily be generalized to another. The authors have many wise things to say about the interpretation of behavior. They are particularly good in discussing how a given category of play

might increase the chances of an animal surviving and reproducing.

The precise nature of the benefits of play remains a matter of dispute, with little hard evidence to distinguish between the possibilities. The list of putative benefits includes the acquisition and honing of physical skills needed later in life, improving problem-solving abilities, cementing social relationships, and tuning the musculature and the nervous system. A notable feature of the mammalian nervous system is the superabundance of connections between neurons at the start of development. As the individual develops, many of these connections are lost, and many cells die. Those neural connections that remain active are retained, and the unused ones are lost. This sculpting of the nervous system reflects the steadily improving efficiency of the body's classification, command, and control systems. These internal changes are reflected in behavior. When young animals playfully practice the stereotyped movements they will use in earnest later in life, they improve the coordination and effectiveness of these behavior patterns. The short dashes and jumps of young gazelles at play bring benefits that may be almost immediate, such as when they face the threat of predation from cheetah or other carnivores intent on a quick meal. Even though the benefits may be immediate in such cases, they may also persist into adult life, not being lost in the behavioral metamorphosis that sometimes occurs during development.

As Judy Stamps has emphasized, young animals may also familiarize themselves with the topography of their local terrain as a result of playing in it. Simply knowing the locations of important physical features will not guarantee

them rapid, safe passage around obstacles when they try to escape from predators or chase prey. They need to practice. In keeping with this hypothesis, rats in a new area will typically first explore it in a cautious manner. Gradually, the speed of movement increases until the rats are running rapidly around the area along what become established pathways. The seemingly playful galloping ensures that, when fast movement becomes serious, the rat will be able to negotiate, efficiently and automatically, all the obstacles that clutter its familiar environment. As it does so, it will be able to monitor the positions of predators, prey, or hostile members of its own species.

A familiar argument is that play, or at least some components of it, allows young animals to simulate, in a relatively safe context, potentially dangerous situations that will arise in their adult life. They learn from their mistakes, but do so in relative safety. In this view, play exerts its most important developmental effects on risky adult behavior such as fighting, mating in the face of serious competition, catching dangerous prey, and avoiding becoming some other animal's prey. Indeed, the behavior patterns of fighting and prey catching are especially obvious in the play of cats and other predators, whereas safe activities such as grooming, defecating, and urinating have no playful counterparts.

If play is beneficial, then it follows that depriving the young animal of play opportunities should have harmful effects on the outcome of its development. This is, indeed, the case. For instance, the lack of play experience shows clearly in the way the animal responds to social competition. In one experiment described by the Pellises, young rats were reared in

isolation with or without an hour of daily play-fighting experience. About a month later they were put in the cage of another rat, where they were almost invariably attacked as an intruder. The defensive behavior of the play-deprived rats was abnormal. They spent significantly more time immobile than did animals that had played earlier in their lives. Other aspects of their defensive behavior were not affected, so the effects of play deprivation appeared to be specific. It seems clear that such deprivation in early life would have adversely affected the individual's capacity to cope in a competitive world. The same argument may explain play fighting in children. Through play, they learn how to cope with aggression and violence—their own and other people's. The Pellises call this "emotional calibration."

Distinguishing between the various hypotheses advanced to explain the current utility of play is difficult because the presumed benefits are usually thought to be delayed, appearing later in life. In addition, developmental systems tend to be highly redundant, so that if an end point is not achieved by one route, it is achieved by another. Playing when young is not the only way to acquire knowledge and skills. The individual can delay acquisition until it is an adult. However, when such experience is gathered without play, the process may be much more costly and difficult. Play has features that make it especially suitable for finding the best way forward. In acquiring skills, individuals are in danger of finding suboptimal solutions to the many problems that confront them. In deliberately moving away from what might look like the final resting point, each individual may get somewhere that is better. Play may, therefore, fulfill an important

probing role that enables the individual to escape from false end points—what engineers call “local optima.”

All of this is rich, interesting, and often conceptually challenging. In general, I liked the breadth of this book and the authors’ obvious enthusiasm for their topic. For anyone who does not study the areas of research they cover and wants to know more, this is a very good place to start.

—Patrick Bateson, *Cambridge University, Cambridge, U.K.*

Nurture Shock: New Thinking About Children

Po Bronson and Ashley Merryman

New York: Twelve, 2009. Notes, references, index. xi, 336 pp. \$24.99 cloth.

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Erik Erikson once wrote, “To be heard in the United States you have to take an extreme position and shout it loudly.” Po Bronson and Ashley Merryman have taken this advice to heart in their new book. The title gives the impression that readers will be shocked by the revelations the authors bring to light. The problem is that they have to create a number of straw men of nature against whom they can take extreme nurture positions. We can tell they are straw men by the numerous qualifications and exceptions the authors are forced to concede in order to take their positions against them.

In the introduction, for example, they suggest that the ideas they challenge are part of the intuitive, inborn wisdom of parents: “Prior to that story, our instincts led us to believe, quite firmly, that it was

important to tell young children they were smart in order to buoy their confidence” (p. 5). First of all, for authors whose claim to originality is based on their scientific knowledge, the use of the term *instinct* is rather amazing. Instincts are inborn patterns of behavior, which psychologists long ago discarded for humans. Perhaps the authors use instinct to enhance their nurture argument, but its use reveals a superficiality that is present throughout the book.

Take the chapter on praise, for example. The authors suggest, as in their introduction, that parents have a natural inclination to overpraise their children. For their evidence, they use data from studies of gifted children who underestimate their abilities. But in these studies, praise was not a variable! In addition, it turns out that overpraise has negative effects only when it is applied to children’s abilities, not to their efforts. Moreover, the authors ignore the fact that parents are as likely to overcriticize their children as they are to overpraise them. (If you doubt this, go a youth soccer or Little League game; you will soon be convinced.) So, do we have an instinct to overcriticize as well?

A few other examples will help show the weakness of the authors’ nurture arguments. In the chapter on adolescent lying, the authors take the nurture view that adolescent storm and stress is not a universal, natural phenomena. Here they join a number of psychologists who argue that adolescence is just a transition stage like any other. What they ignore is the fact that adolescence is not a unitary stage—it has distinct phases. Storm and stress are part of the first stage when hormones are raging, emotions are changing, and adolescent bodies are going through a metamorphosis.